

Summary

Climate change adaptation in Barossa Valley compared to the Rhône Valley – Challenges, Methods, and Future Potential

Motivation

Growing wines is a climatically sensitive matter with only a narrow range of geographical areas providing the required combinations of temperature, moisture, and soil. Local changes in weather like hail or heavy rain have always challenged winemakers. It is global and regional climate change however which is worsening winegrowing conditions through warming and lower annual rainfall, requiring more stringent adaptations from winemakers. How much and which adaptations will be necessary depends on the winegrowing regions and levels of future global warming. Below 2°C global warming, most traditional regions will remain suitable for winegrowing, albeit with adaptation measures. If more severe warming scenarios occur, “the suitable surface area of traditional wine-producing regions is expected to decline by 20-70% by the end of the century” (van Leeuwen et al. 2024).

The Rhône and the Barossa Valley are at the forefront of this development. Due to their geographical location, they will be earlier exposed to global warming before other, cooler regions.

Objective of the thesis

The study compares the Rhône Valley and the Barossa Valley with the objective of analysing how well challenges from climate change are currently mitigated by adaptation methods in site selection, vineyard, and cellar management. The hypothesis is that winemakers in Barossa Valley pursue a different set of adaptation measures than in the Rhône Valley. Irrigation for example is increasingly used in Barossa while it is only allowed in case of droughts in the Rhône region. Furthermore, depending on the future degree of global warming, winemakers in both regions will need to consider more, and different adaptation options.

Approach

The study pursues a qualitative approach which is based on research of the most recent literature about winegrowing under global warming and was finished in May 2024.

Interviews with winemakers in both regions were conducted in March 2024 on the ProWein Fair in Düsseldorf. Processing of all information and writing took place in April 2024 with finetuning and final corrections in May 2024.

Summary

Climate change is an undisputable fact and viticulture is one of the most affected areas. The main influencing climate change factors for viticulture are increasing temperatures, drought, new pests and diseases, and more frequent extreme weather events like hail, frost, or heatwaves. In both, Barossa and the Rhône Valleys, temperatures have risen already, causing the vine growing cycle to advance and shifting grape ripening into months with much higher temperatures. Rising temperatures during winter increase the risk of pests and diseases. Declining or irregular rainfall makes winegrowing further difficult. In Barossa, which is much drier than the Rhône, irrigation is becoming standard for new vineyards.

Summary

If future warming will stay below or close to 2°C, winemakers can use the full suite of adaptation measures in vineyards and in wineries described in the thesis. In all regions, short-term adaptation measures until 2030 include harvest management, winemaking techniques, acidification, and blending, followed by canopy management, soil management and adjustments in pest and disease control. Medium-term adaptation measures from 2030 to 2050 predicted for both regions are site evaluations for suitable microclimates, rootstock selection, clonal selection, and extensive usage of wines with older rootstocks. Rhône winemakers may look towards Barossa Valley where alcohol reduction as well as water management and irrigation frequently are applied. Barossa Valley winemakers are also ahead of their French counterparts in sustainable winery management.

For both regions, climate forecasts expect temperature increases above 2°C after 2050 towards the end of the century. With this degree of warming, it will become impossible to grow current varieties. Irrigation will become a necessity. Careful site selection and relocations will become important as well. Barossa and the Southern Rhône with their warmer, Mediterranean climate are at the forefront of this development.

Recommendations

Winemakers will need to broaden their climate change adaptations from today to more tactical and strategic adaptations within the 2030 to 2050 timeframe. The full suite of described short-term and rather operational adaptations will not suffice.

With further rising temperatures above 2°C after 2050, all the long-term plus new and more expensive adaptations will become necessary, for example:

- Site selection and planting
 - Selection of suitable microclimates within regions will become much more important (Precision viticulture)
 - Better adjustment of varieties for climate conditions, soils, suitable rootstock – cultivar combinations and clones for microclimates and sites
 - Relocation into cooler, less arid regions
- Vineyard management
 - More heat resistant varieties and rootstocks
 - Different training and pruning systems
- Winery management
 - Advanced techniques for lowering alcohol
 - Further advances in sustainable winery management

Furthermore, a combination of detailed, long-term climate forecasts is required to understand business viability next to short-term, reliable weather forecasts to manage extreme events from frost and hail to heatwaves. AOP regulations will have to change and for example allow different, more heat resistant rootstocks and varieties. Further analysis is also required into business cases and industry structures for expensive adaptations. Support from institutes, regulators and governments is needed to understand whether collective or public ownership models make such measures feasible.